Federal Aviation Administration – Regulations and Policies
Aviation Rulemaking Advisory Committee

Transport Airplane and Engine Issue Area
Flight Test Harmonization Working Group

Task 4 – Harmonize of Airworthiness Standards – Flight Rules

Task Assignment

[Federal Register: September 18, 1998 (Volume 63, Number 181)]
[Notices]
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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee; Transport Airplane and Engine Issues--New Task

AGENCY: Federal Aviation Administration (**FAA**), DOT.

ACTION: Notice of new task assignment for the Aviation Rulemaking Advisory Committee (ARAC).

SUMMARY: Notice is given of a new task assigned to and accepted by the Aviation Rulemaking Advisory Committee (ARAC). This notice informs the public of the activities of ARAC.

FOR FURTHER INFORMATION CONTACT:
Stewart R. Miller, Transport Standards Staff (ANM-110), Federal Aviation Administration, 1601 Lind Avenue, SW., Renton, WA 98055-4056; phone (415) 227-1255; fax (415) 227-1320.

SUPPLEMENTARY INFORMATION:

Background

The **FAA** has established an Aviation Rulemaking Advisory Committee to provide advice and recommendations to the **FAA** Administrator, through the Associate Administrator for Regulation and Certification, on the full range of the **FAA**'s rulemaking activities with respect to aviation-related issues. This includes obtaining advice and recommendations on the **FAA**'s commitment to harmonize its Federal Aviation Regulations (FAR) and practices with its trading partners in Europe and Canada.

One area ARAC deals with is Transport Airplane and Engine Issues. These issues involve the airworthiness standards for transport category airplanes and engines in 14 CFR parts 25, 33, and 35 and parallel provisions in 14 CFR parts 121 and 135.

The Task

This notice is to inform the public that the **FAA** has asked ARAC to provide advice and recommendation on the following harmonization task

Task 3: Harmonization of Airworthiness Standards; Flight Rules

The following differences between Part 25 and JAR 25 and their associated guidance material have been identified as having a

potentially significant impact on airplane design:

1. Section 25.107(e)(1)(iv) requires a greater margin between V<INF>LOF</INF> and V<INF>MU</INF> than JAR 25.107(e)(1)(iv) for airplanes where liftoff attitude is limited either by geometry or elevator power. The **FAA** permits a reduction in the margin for

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the geometry-limited case with all-engines-operating via a finding of equivalent safety, as noted in Advisory Circular 25-7A, but does not permit a reduction in the margin for the engine-inoperative case.

2. JAR 25.147(c) includes an additional requirement regarding roll rate with one-engine inoperative relative to Sec. 25.147(c).

3. JAR 25.253(a)(3) contains in additional requirement relative to Sec. 25.253(a)(3); namely, that adequate roll capability must be available to assure a prompt recovery from a lateral upset condition.

4. JAR 25.253(a) (5), which has no Part 25 equivalent, specifies that extension of airbrakes at speeds above the maximum operating speed/Mach number (V<INF>MO</INF>/M<INF>MO</INF>) must not result in an excessive positive load factor with the stick free and any nose-down pitching moment must be small.

For each of the above four issues the working group is to review airworthiness, safety, cost, and other relevant factors related to the specified differences, and reach consensus on harmonized Part 25/JAR 25 regulations and guidance material.

The **FAA** expects ARAC to submit its recommendation by December 31, 2000.

The **FAA** requests that ARAC draft appropriate regulatory documents with supporting economic and other required analyses, and any other related guidance material or collateral documents to support its recommendations. If the resulting recommendations(s) are one or more notices of proposed rulemaking (NPRM) published by the **FAA**, the **FAA** may ask ARAC to recommend disposition of any substantive comments the **FAA** receives.

Working Group Activity

The Flight Test Harmonization Working Group is expected to comply with the procedures adopted by ARAC. As part of the procedures, the working group is expected to:

1. Recommend a work plan for completion of the tasks, including the rationale supporting such a plan, for consideration at the meeting of ARAC to consider transport airplane and engine issues held following publication of this notice.

2. Give a detailed conceptual presentation of the proposed recommendations, prior to proceeding with the work stated in item 3 below.

3. Draft appropriate regulatory documents with supporting economic and other required analyses, and/or any other related guidance material or collateral documents the working group determines to be appropriate; or, if new or revised requirements or compliance methods are not recommended, a draft report stating the rationale for not making such recommendations. If the resulting recommendation is one or more notices of proposed rulemaking (NPRM) published by the **FAA**, the **FAA** may ask ARAC to recommend disposition of any substantive comments the **FAA** receives.

4. Provide a status report at each meeting of ARAC held to consider

transport airplane and engine issues.

The Secretary of Transportation has determined that the formation and use of ARAC are necessary and in the public interest in connection with the performance of duties imposed on the **FAA** by law.

Meetings of ARAC will be open to the public. Meetings of the Flight Test Harmonization Working Group will not be open to the public, except to the extent that individuals with an interest and expertise are selected to participate. No public announcement of working group meetings will be made.

Issued in Washington, DC, on September 14, 1998.

Joseph A. Hawkins,

Executive Director, Aviation Rulemaking Advisory Committee.

[FR Doc. 98-25069 Filed 9-17-98; 8:45 am]

BILLING CODE 4910-13-M

Recommendation Letter

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

APR 10 1995

Mr. Gerald R. Mack
Aviation Rulemaking Advisory Committee
Boeing Commercial Airplane Group
P.O. Box 3707, M/S 67-UM
Seattle, WA 98124-2207

Dear Mr. Mack:

In response to the task announced in the Federal Register on January 13, 1992 (57 FR 1297), the Aviation Rulemaking Advisory Committee (ARAC) developed a notice of proposed rulemaking (NPRM) to amend airworthiness standards to harmonize with European airworthiness standards for transport category airplanes. Comments received in response to the NPRM were considered to be non-substantive; consequently, the final action will be developed internally by the Federal Aviation Administration (FAA).

Let me thank ARAC and, in particular, the Flight Test Harmonization Working Group for its dedicated efforts in completing the task assigned by the FAA.

If you have any questions, please contact Mr. Mike Borfitz at (617) 238-7110.

Sincerely,

for Anthony J. Broderick
Associate Administrator for
Regulation and Certification

Acknowledgement Letter

400 Main Street
East Hartford, Connecticut 06108

Pratt & Whitney
A United Technologies Company

July 6, 2000

Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Attention: Mr. Thomas McSweeny, Associate Administrator for Regulation and Certification

Subject: Submittal of ARAC Recommendation

Reference: FAA Tasking to TAEIG, dated November 19, 1999.

Dear Tom,

In accordance with the reference tasking, the ARAC Transport Airplane and Engine Issues Group is pleased to provide the attached "Fast Track" reports to the FAA as an ARAC recommendation.

25.253(a)(5) #4
25.177(d)
25.101(c) #5
25.177(c)

These reports have been prepared by the Flight Test Harmonization Working Group of TAEIG.

Sincerely yours,

C. R. Bolt

C. R. Bolt
Assistant Chair, TAEIG

copies: *Bob Park- Boeing
Kristin Carpenter - FAA
*Effie Upshaw - FAA

*letter only

CRB_07_06_00_5

Recommendation

RPR # _____

ANM-95-464-A

ARAC WG Report

Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25.107(e)(1)(iv)

What is the underlying safety issue addressed by the FAR/JAR?: This requirement ensures that the scheduled takeoff speeds provide a minimum liftoff speed (V_{LOF}) greater than the minimum safe flyaway speed (V_{MU}). V_{MU} is the speed at which it is demonstrated that no hazardous characteristics are present, such as a relatively high drag condition or a stall. A minimum speed margin between V_{LOF} and V_{MU} is prescribed by this rule to ensure a safe takeoff speed, considering likely in-service variations in speed during the takeoff maneuver.

What are the current FAR and JAR standards?: see below

FAR/JAR 25.107(e)(1) V_R may not be less than –

Current FAR text: A speed that, if the airplane is rotated at its maximum practicable rate, will result in a V_{LOF} of not less than 110% of V_{MU} in the all-engines-operating condition and not less than 105% of V_{MU} determined at the thrust-to-weight ratio corresponding to the one-engine-inoperative condition.

Current JAR text: A speed that, if the aeroplane is rotated at its maximum practicable rate, will result in a V_{LOF} of not less than 110% of V_{MU} in the all-engines-operating condition and not less than 105% of V_{MU} determined at the thrust-to-weight ratio corresponding to the one-engine-inoperative condition, except that in the particular case that lift-off is limited by the geometry of the aeroplane, or by elevator power, the above margins may be reduced to 108% in the all-engines-operating case and 104% in the one-engine-inoperative condition. (See ACJ 25.107(e)(1)(iv).)

What are the differences in the standards and what do these differences result in?: The JAR allows a reduction in the speed margins between V_{MU} and V_{LOF} for airplanes for which the minimum liftoff speed is limited by the geometry of the airplane (i.e., ground contact with the runway) or by elevator power (i.e., the liftoff pitch attitude is limited by the capability of the elevator to generate an aerodynamic force to pitch the airplane). The JAA consider these limiting conditions to provide protection against early or over-rotation beyond the safe liftoff pitch attitude at or near V_{MU} such that the prescribed minimum speed margin can be reduced without reducing the level of safety.

The takeoff speeds provided to the pilot consist of the takeoff rotation speed (V_R) and the takeoff safety speed (V_2). V_R is the speed used by the pilot to begin raising the nosewheel off the runway during the acceleration to V_2. In general, the lower the V_R speed, the shorter the takeoff distance. The minimum value of V_R is limited by the requirements of

§ 25.107(e). In accordance with § 25.107(e), V_R must be not be less than: (a) V_1, (b) 1.05 times the minimum control speed (V_{MC}), (c) a speed that allows reaching V_2 before reaching 35 feet above the takeoff surface, or (d) a speed that, if the airplane is rotated at its maximum practicable rate, will result in a V_{LOF} that provides the prescribed minimum speed margin between V_{MU} and V_{LOF}.

In cases where the minimum value of V_R is limited by the speed margin between V_{MU} and V_{LOF}, allowing a reduction in this speed margin would result in shorter required takeoff distances. For a given runway length, the reduced speed margins would permit a higher takeoff weight.

Although the FAR does not contain the provisions regarding reduced speed margins for geometry or elevator power limited airplanes, a reduction in the speed margin for the all-engines-operating condition for geometry-limited airplanes has been granted on more than one occasion on the basis of equivalent safety. The resulting speed margin that has been applied is the same as that specified in the JAR for this condition – 108%.

This difference between the FAR and JAR standards only affects airplanes that have: (1) V_R speeds that are determined by the speed margin between V_{MU} and V_{LOF}, and (2) V_{MU} speeds that are limited by takeoff pitch attitude either due to airplane geometry or elevator power. Airplanes that have been FAA type-certificated to the reduced V_{MU} to V_{LOF} speed margin for the all-engines-operating condition include the Boeing 727, some models of the Boeing 707, and all Airbus models. For JAA certification only, the Airbus A330 and A340 airplanes were also certificated to the reduced one-engine-inoperative speed margin.

Other airplane types may have qualified for the reduced speed margins, but in each case the applicants chose not to pursue that option. In most such cases, the one-engine-inoperative condition was the limiting condition and the availability of a reduced all-engines-operating V_{MU} to V_{LOF} speed margin for FAA certification would not have resulted in any change to the minimum required takeoff speeds. In these cases, the applicants also chose to retain the same takeoff speeds for FAA and JAA certification, in spite of the availability of a reduced speed margin for the one-engine-inoperative condition under the JAR. In other cases, the minimum required takeoff speeds were determined by one of the criteria other than the minimum required speed margin between V_{MU} and V_{LOF}, and therefore, a reduced speed margin between V_{MU} and V_{LOF} would not have affected the minimum required takeoff speeds.

What, if any, are the differences in the means of compliance?: The differences in the means of compliance only reflect the differences in the standards. These differences are addressed through analysis because the prescribed speed margins are applied analytically. Normally, there would not be any additional flight testing involved, nor are there design or construction differences. The rotation speeds and associated takeoff distance data provided in the Airplane Flight Manual would be different for affected airplanes.

What is the proposed action?: The proposed action is to harmonize the two standards by allowing a reduction in the all-engines-operating and one-engine-inoperative speed margins for geometry-limited airplanes as in the current JAR, but not to allow such an alleviation for elevator power-limited airplanes, which the JAR also allows. The geometry-limited airplane is physically limited from reaching a takeoff pitch attitude while on the runway beyond that which has shown to be safe. Because the minimum required speed margin between V_{MU} and V_{LOF} is partly there to reduce the probability for an airplane to reach a takeoff pitch attitude beyond that which has shown to be safe, it would be appropriate to allow this minimum speed margin to be reduced for a geometry-limited airplane.

After the airplane is airborne and is no longer in close proximity to the ground, the geometry-limited airplane has no more protection against reaching an unsafe pitch attitude than a non-geometry-limited airplane. However, the geometry-limited airplane may actually have a larger safety margin than that implied by the proposed speed margin. If the airplane were not geometry-limited, the airplane may have been capable of reaching higher pitch attitudes and lower V_{MU} speeds.

An airplane for which the takeoff pitch attitude is limited by elevator power, however, does not have the same degree of protection from reaching a pitch attitude beyond that which has been shown to be safe. This protection from early or over-rotation may not exist for more aft loading conditions, mistrim conditions, or at speeds above V_{MU}. Therefore, the reduction in minimum speed margins between V_{MU} and V_{LOF} will not be permitted for elevator power-limited airplanes.

In addition, harmonized advisory material is proposed that would provide information on an acceptable means of showing compliance to the proposed standard. While this proposed advisory material is similar to the current guidance provided in AC 25-7A, some changes are being proposed. The most significant proposed change is the deletion of the need for safeguards protecting the geometry limited airplane against overrotation on the ground and in the air. Simply by virtue of being geometry limited, the airplane is safeguarded from overrotation on the ground and shortly after liftoff. Once the airplane is no longer in close proximity to the ground, it is not entirely clear what would constitute an "overrotation." The existing requirements require adequate stall warning to be provided, so that overrotation to the point of stall is already safeguarded.

Another proposed change to the AC 25-7A advisory material is to delete the need for the airplane's pitch attitude to be within 5 percent (in degrees) of the tail dragging attitude during the speed range between 96 and 100 percent of the actual liftoff speed. The intent of this criterion is to ensure that the airplane is actually geometry-limited, and that no unique flight test techniques are being used to attain the geometry-limited condition. Although the intent is a good one, strict compliance with the 5 percent allowed variation in pitch attitude is very difficult to achieve. Instead, the FTHWG considers this intent to be addressed by proposed changes to the criterion that the aft under-surface of the airplane achieves contact with the runway during the speed range between 96 and 100

percent of the actual liftoff speed. The FTHWG proposes that this criterion state that the airplane's aft under-surface should be in contact with the runway during this speed range, not just that runway contact must be made at some point in the speed range. Additional words would be added to clarify that due to the dynamic nature of the test, however, it is recognized that runway contact will probably not be maintained during this entire speed range, and that some judgment is necessary as to whether the airplane is geometry-limited.

Lastly, the proposed advisory material clarifies that the condition at which the compliance criteria are evaluated should be the lowest thrust-to-weight ratio for the all-engines-operating condition. This condition is expected to be the most critical condition for demonstrating a safe flyaway capability.

The FTHWG considered whether the proposed standard could potentially result in a higher incidence of tail contact with the runway (i.e., tailstrikes) during normal operations. After a review of a representative set of data, the FTHWG concluded that: (1) no evidence exists to show that the proposed V_R reduction for geometry-limited airplanes (currently permitted by the JAR) has led to more tailstrikes or resulted in any other safety problem; (2) a small variation in V_R (such as that which would result from application of the proposed standard) is not a major contributor to tailstrikes; and (3) 60-75% of tailstrikes occur on landing.

What should the harmonized standard be?: see below

Proposed text of harmonized standard:

> FAR/JAR 25.107(e)(1)(iv) A speed that, if the airplane is rotated at its maximum practicable rate, will result in a V_{LOF} of not less than –
> (A) 110 percent of V_{MU} in the all-engines-operating condition, and 105 percent of V_{MU} determined at the thrust-to-weight ratio corresponding to the one-engine-inoperative condition; or
> (B) If V_{MU} is limited by the geometry of the airplane (i.e., tail contact with the runway), 108 percent of V_{MU} in the all-engines-operating condition and 104 percent of V_{MU} determined at the thrust-to-weight ratio corresponding to the one-engine-inoperative condition.

How does this proposed standard address the underlying safety issue?: The proposed standard continues to address the underlying safety issue in the same manner, but allows the prescribed minimum speed margin between V_{MU} and V_{LOF} to be reduced if the V_{MU} speed is limited by the geometry of the airplane. In this case, the geometry of the airplane helps to prevent reaching a potentially hazardous pitch attitude at, or shortly after takeoff.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?: Although the proposed standard would allow a reduction in the V_{MU} to V_{LOF} speed margin for certain airplanes, it would maintain the same level of safety relative to that intended by the current standards. The reduced speed margin would apply

only to airplanes for which V_{MU} is limited by airplane geometry, such that a hard physical limit (fuselage contact with the runway) protects the airplane from reaching a potentially hazardous takeoff pitch attitude while still on the ground. Since the minimum required speed margin between V_{MU} and V_{LOF} is, in part, intended to reduce the probability for an airplane to reach a takeoff pitch attitude beyond that which has shown to be safe, the additional protection against such a condition inherent to a geometry-limited airplane would allow the V_{MU} and V_{LOF} speed margin to be reduced while providing the same level of safety. Currently, the FAA allows, by equivalent safety finding, a reduction in the V_{MU} to V_{LOF} speed margin for the all-engines-operating condition. The proposed standard would codify this practice and extend its application to the one-engine-inoperative condition.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?: Current industry practice varies. However, the proposed standard would not allow the level of safety to be reduced below that already practiced within the industry as a whole.

What other options have been considered and why were they not selected?: Other options that were considered were to retain either the existing FAR standard or the existing JAR standard. Retaining the existing FAR standard would provide a more stringent requirement, but it is anticipated that this would simply lead to more requests for equivalent safety findings and result in compliance with something close to the proposed standard.

Harmonizing on the JAR standard would not retain the existing level of safety for airplanes that are limited by elevator power. A lack of elevator power would not provide an equivalent level of protection against over-rotation as a geometry limit. In the elevator power limited case, in-service errors in determining the airplane center-of-gravity location or elevator trim position could override the elevator power limit.

Who would be affected by the proposed change?: Manufacturers and operators of transport category airplanes would be affected by the rule change. Operators could be affected to the extent that takeoff speeds, and hence, allowable takeoff weights could be affected by the proposed change. Because the proposed change is alleviating, operators may realize an economic benefit.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?: It should be stated in the preamble that an airplane that is deemed to be geometry-limited at the test conditions referenced in AC 25-7A is expected to be geometry-limited over its entire takeoff operating envelope. If not, the airplane is not considered geometry-limited and the reduced V_{MU} to V_{LOF} speed margins do not apply.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?): The existing advisory material needs to be harmonized and revised to reflect the proposed harmonized standard.

Proposed advisory material: (AC 25-7A)

(viii) V_{MU} Testing for Geometry Limited Airplanes.

(A) For airplanes that are geometry limited (i.e., the minimum possible V_{MU} speeds are limited by tail contact with the runway), § 25.107(e)(1)(iv)(B) allows the V_{MU} to V_{LOF} speed margins to be reduced to 108 percent and 104 percent for the all-engines-operating and one-engine-inoperative conditions, respectively. The V_{MU} demonstrated must be sound and repeatable.

(B) One acceptable means for demonstrating compliance with §§ 25.107(d) and 25.107(e)(1)(iv) with respect to the capability for a safe liftoff and fly-away from the geometry limited condition is to show that at the lowest thrust-to-weight ratio for the all-engines-operating condition:

(1) During the speed range from 96 to 100 percent of the actual liftoff speed, the aft under-surface of the airplane should be in contact with the runway. Because of the dynamic nature of the test, it is recognized that contact will probably not be maintained during this entire speed range, and some judgment is necessary. It has been found acceptable for contact to exist approximately 50 percent of the time that the airplane is in this speed range.

(2) Beyond the point of liftoff to a height of 35 ft., the airplane's pitch attitude should not decrease below that at the point of liftoff, nor should the speed increase more than 10 percent.

(3) The horizontal distance from the start of the takeoff to a height of 35 feet should not be greater than 105 percent of the distance determined in accordance with § 25.113(a)(2) without the 115 percent factor.

How does the proposed standard compare to the current ICAO standards?: The ICAO standards do not contain specific requirements in this area.

Does the proposed standard affect other harmonization working groups?: No.

What is the cost impact of complying with the proposed standard?: The proposed standard would be cost beneficial in that there is a potential for a small increase in payload for geometry-limited airplanes than is currently available under the FAR with no change to the cost of certification. The proposed standard would have no effect on the cost of certifying or operating airplanes that are not deemed geometry-limited.

RPR # _____

Does the working group want to review the draft NPRM prior to publication in the Federal Register?: Yes

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain: Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

FAA Action

federal register

Friday
April 22, 1994

Part III

Department of Transportation

Federal Aviation Administration

14 CFR Parts 1 and 25
Revision of Certain Flight Airworthiness Standards To Harmonize With European Airworthiness Standards for Transport Category Airplanes; Proposed Rule and Notice

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 1 and 25

[Docket No. 27705; Notice No. 94–15]

RIN AF 25

Revision of Certain Flight Airworthiness Standards To Harmonize With European Airworthiness Standards for Transport Category Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Federal Aviation Administration (FAA) proposes to amend part 25 of the Federal Aviation Regulations (FAR) to harmonize certain flight requirements with standards proposed for the European Joint Aviation Requirements 25 (JAR–25). This action responds to a petition from the Aerospace Industries Association of America, Inc. and the Association Europeenne des Constructeurs de Materiel Aerospatial. These changes are intended to benefit the public interest by standardizing certain requirements, concepts, and procedures contained in the airworthiness standards of the FAR and the JAR.

DATES: Comments must be received on or before July 21, 1994.

ADDRESSES: Comments on this notice may be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC–10), Docket No. 27705, 800 Independence Avenue SW., Washington, DC 20591; or delivered in triplicate to: Room 915G, 800 Independence Avenue SW., Washington, DC 20591. Comments delivered must be marked Docket No. 27705. Comments may be examined in room 915G weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m. In addition, the FAA is maintaining an information docket of comments in the Transport Airplane Directorate (ANM–100), Federal Aviation Administration, Northwest Mountain Region, 1601 Lind Avenue SW., Renton, WA 98055–4056. Comments in the information docket may be examined weekdays, except Federal holidays, between 7:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT: Donald K. Stimson, Flight Test and Systems Branch, ANM–111, Transport Airplane Directorate, Aircraft Certification Service, FAA, 1601 Lind Avenue SW., Renton, WA 98055–4056; telephone (206) 227–1129; facsimile (206) 227–1320.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this proposed rulemaking by submitting such written data, views, or arguments as they may desire. Comments relating to any environmental, energy, or economic impact that might result from adopting the proposals contained in this notice are invited. Substantive comments should be accompanied by cost estimates. Commenters should identify the regulatory docket or notice number and submit comments in triplicate to the Rules Docket address above. All comments received on or before the closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments received will be available in the Rules Docket, both before and after the comment period closing date, for examination by interested persons. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Persons wishing the FAA to acknowledge receipt of their comments must submit with those comments a self-addressed, stamped postcard on which is stated: "Comments to Docket No. 27705." The postcard will be date stamped and returned to the commenter.

Availability of the NPRM

Any person may obtain a copy of this notice by submitting a request to the Federal Aviation Administration (FAA), Office of Public Affairs, Attention: Public Inquiry Center, APA–230, 800 Independence Avenue SW., Washington, DC 20591; or by calling (202) 267–3484. The notice number of this NPRM must be identified in all communications. Persons interested in being placed on a mailing list for future rulemaking documents should also request a copy of Advisory Circular No. 11–2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

Part 25 of the Federal Aviation Regulations (FAR) contains the airworthiness standards for transport category airplanes. Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the relevant standards of part 25. These standards apply to airplanes manufactured within the U.S. for use by U.S.-registered operators and to airplanes manufactured in other countries and imported under a bilateral airworthiness agreement.

In Europe, the Joint Aviation Requirements (JAR) were developed by the Joint Aviation Authorities (JAA) to provide a common set of airworthiness standards for use within the European aviation community. The airworthiness standards for European type certification of transport category airplanes, JAR–25, are based on part 25 of the FAR. Airplanes certificated to the JAR–25 standards, including airplanes manufactured in the U.S. for export to Europe, receive type certificates that are accepted by the aircraft certification authorities of 23 European countries.

Although part 25 and JAR–25 are very similar, they are not identical. Differences between the FAR and the JAR can result in substantial additional costs when airplanes are type certificated to both standards. These additional costs, however, do not always bring about an increase in safety. For example, part 25 and JAR–25 may use different means to accomplish the same safety intent. In this case, the manufacturer is usually burdened with meeting both requirements, although the level of safety is not increased correspondingly. Recognizing that a common set of standards would not only economically benefit the aviation industry, but would also maintain the necessary high level of safety, the FAA and JAA consider harmonization to be a high priority.

On May 22, 1990, the Aerospace Industries Association of America, Inc. (AIA) and the Association Europeenne des Constructeurs de Materiel Aerospatial (AECMA) jointly petitioned the FAA and JAA to harmonize certain requirements contained in part 25 of the FAR and in JAR–25. In their petition, a summary of which was published in the July 17, 1990, edition of the **Federal Register** (55 FR 137), AIA and AECMA requested changes to §§ 25.143(c), 25.143(f), 25.149, and 25.201 to standardize the requirements, concepts, and procedures for certification flight testing and to enhance reciprocity between the FAA and JAA. In addition, AIA and AECMA recommended changes to FAA Advisory Circular (AC) 25–7, "Flight Test Guide for Certification of Transport Category Airplanes," to ensure that the harmonized standards would be interpreted and applied consistently. A copy of that petition is included in the docket for this rulemaking.

On September 26, 1991, the Aviation Rulemaking Advisory Committee (ARAC) established the Flight Test Working Group, assigning it the task of developing either a draft notice of proposed rulemaking (NPRM) or a denial of the AIA/AECMA petition. If accepted by the ARAC, the draft NPRM or petition denial would be delivered to the FAA as an advisory committee recommendation.

The public notice establishing the Flight Test Working Group appeared in the **Federal Register** on January 13, 1992 (57 FR 1297). The Flight Test Working Group was later renamed the Flight Test Harmonization Working Group and its scope was clarified to include developing a similar proposal to amend JAR–25, as necessary, to achieve harmonization.

The rulemaking proposal contained in this notice was developed by the Flight Test Harmonization Working Group. It was presented to the FAA by the ARAC as a recommended response to the AIA/AECMA petition. Rather than proposing a simple acceptance or denial of the petition, the working group used the petition as a starting point for developing a rulemaking proposal that would accomplish the goal of harmonizing not only the sections of part 25 and JAR–25 addressed in the petition, but also related sections.

The Aviation Rulemaking Advisory Committee

The ARAC was formally established by the FAA on January 22, 1991 (56 FR 2190), to provide advice and recommendations concerning the full range of the FAA's safety-related rulemaking activity. This advice was sought to develop better rules in less overall time using fewer FAA resources than are currently needed. The committee provides the opportunity for the FAA to obtain firsthand information and insight from interested parties regarding proposed new rules or revisions of existing rules.

There are over 60 member organizations on the committee, representing a wide range of interests within the aviation community. Meetings of the committee are open to the public, except as authorized by section 10(d) of the Federal Advisory Committee Act.

The ARAC establishes working groups to develop proposals to recommend to the FAA for resolving specific issues. Tasks assigned to working groups are published in the **Federal Register**. Although working group meetings are not generally open to the public, all interested parties are invited to participate as working group members. Working groups report directly to the ARAC, and the ARAC must concur with a working group proposal before that proposal can be presented to the FAA as an advisory committee recommendation.

The activities of the ARAC will not, however, circumvent the public rulemaking procedures. After an ARAC recommendation is received and found acceptable by the FAA, the agency proceeds with the normal public rulemaking procedures. Any ARAC participation in a rulemaking package will be fully disclosed in the public docket.

Discussion of the Proposals

The FAA proposes amending certain sections of the FAR, as recommended by the ARAC, to harmonize these sections with JAR–25. The JAA intend to publish a Notice of Proposed Amendment (NPA), also developed by the Flight Test Harmonization Working Group, to revise JAR–25, as necessary, to ensure harmonization in those areas for which the proposed amendments differ from the current JAR–25. When it is published, the NPA will be placed in the docket for this rulemaking.

The FAA proposes to: (1) Introduce the term "go-around power or thrust setting" to clarify certain part 25 flight requirements; (2) revise the maximum control forces permitted for demonstrating compliance with the controllability and maneuverability requirements; (3) provide requirements for stick force and stick force gradient in maneuvering flight; (4) revise and clarify the requirements defining minimum control speed during approach and landing; (5) clarify the procedural and airplane configuration requirements for demonstrating stalls and revise the list of acceptable flight characteristics used to define the occurrence of stall; and (6) require that stall characteristics be demonstrated for turning flight stalls at deceleration rates up to 3 knots per second.

Revisions are also proposed for AC 25–7 to ensure consistent application of these proposed revised standards. Public comments concerning the revisions to AC 25–7 are invited by separate notice published elsewhere in this issue of the **Federal Register**.

Proposal 1

Certain part 25 flight requirements involving flight conditions other than takeoff (i.e., §§ 25.119, 25.121(d), 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.145(c)(1), 25.149(f)(6), and 25.149(g)(7)(ii)) specify using the maximum available takeoff power or thrust as being representative of the appropriate maximum in-flight power or thrust. In practice, however, the power or thrust setting used to obtain the maximum in-flight power or thrust (commonly referred to as the go-around power or thrust setting) usually differs from the setting used for takeoff. In the past, the FAA interpreted the words "maximum available takeoff power or thrust" to mean the maximum in-flight power or thrust, with the takeoff power or thrust setting not always being "available" in flight. The FAA proposes changing the nomenclature to "go-around power or thrust setting" for clarity and to reflect terminology commonly used in the operational environment. (In the context of this discussion, the term "go-around" refers to a deliberate maneuver to abort a landing attempt prior to touchdown by applying the maximum available power or thrust, retracting flaps, and climbing to a safe level-off altitude).

(The go-around power or thrust setting may differ from the takeoff power or thrust setting, for example, due to the airspeed difference between the takeoff and go-around flight conditions. In addition, complying with the powerplant limitations of § 25.1521 may result in a lower power setting at the higher airspeeds associated with a go-around. As another example, the controllability requirements of §§ 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.149(f), and 25.149(g) may also limit the go-around power or thrust setting to less than that used for takeoff. Another reason to separate the takeoff and go-around power (or thrust) nomenclature is that certification practice has not required, and applicants have not always proposed, changing the go-around power or thrust setting when a previously approved takeoff power or thrust is increased.

The FAA proposes to substitute the term "go-around power or thrust setting" for "maximum available takeoff power or thrust" in §§ 25.119, 25.121(d), 25.145(b)(3), 25.145(b)(4), 25.145(c)(1), 25.149(f)(6), and 25.49(g)(7)(ii). (Note that the requirement of § 25.145(b)(5) also uses the power specified in § 25.145(b)(4)). In addition, the FAA proposes to define "go-around power or thrust setting" in part 1 as "the maximum allowable in-flight power or thrust setting identified in the performance data." With this revision, the FAA would clarify that the applicable controllability requirements should be based on the same power or thrust setting used to determine the approach and landing climb performance contained in the approved Airplane Flight Manual (AFM).

The proposed terminology refers to a power or thrust "setting" rather than a power or thrust to make it clear that existing engine ratings would be unaffected. The powerplant limitations of § 25.1521 would continue to apply at the go-around power (or thrust) setting. Existing certification practices would also remain the same, including the relationship between the power or thrust values used to comply with the landing and approach climb requirements of §§ 25.119 and 25.121(d). For example, the thrust value used to comply with § 25.121(d) may be greater than that used for § 25.119, if the operating engine(s) do not reach the maximum allowable in-flight thrust by the end of the eight second time period specified in § 25.119.

Proposal 2

The FAA proposes to revise the table in § 25.143(c) to match the control force limits currently provided in JAR 25.143(c). This table prescribes the maximum control forces for the controllability and maneuverability flight testing required by §§ 25.143(a) and 25.143(b). For transient application of the pitch and roll control, the revised table would contain more restrictive maximum control force limits for those maneuvers in which the pilot might be using one hand to operate other controls, relative to those maneuvers in which both hands are normally available for applying pitch and roll control. The revised table would retain the current control force limits for transient application of the yaw control, and for sustained application of the pitch, roll, and yaw controls.

For maneuvers in which only one hand is assumed to be available, the FAA proposes to reduce the maximum permissible control forces from 75 pounds to 50 pounds for pitch control, and from 60 pounds to 25 pounds for roll control. These lower control forces would be more consistent with § 25.145(b), which states that a force of 50 pounds for longitudinal (pitch) control is "representative of the maximum temporary force that readily can be applied by one hand." In addition to adding more restrictive control force limits for maneuvers in which only one hand may be available to apply pitch and roll control, the FAA proposes to reduce the maximum permissible force for roll control from 60 pounds to 50 pounds for maneuvers in which the pilot normally has both hands available to operate the control.

The FAA proposes to further revise § 25.143(c) by specifying that the table of maximum permissible control forces applies only to conventional wheel type controls. This restriction, also specified in the current JAR 25.143(c), recognizes that different control force limits may be necessary when considering sidestick controllers or other types of control systems.

For clarification, the FAA proposes to replace the terms "temporary" and "prolonged," used in §§ 25.143(c), 25.143(d), 25.143(e), and 25.145(b), with "transient" and "sustained," respectively. "Transient" forces refer to those control forces resulting from maintaining the intended flight path during changes to the airplane configuration, normal transitions from one flight condition to another, or regaining control after a failure. The pilot is assumed to take immediate action to reduce or eliminate these forces by retrimming or by changing the airplane configuration or flight condition. "Sustained forces," on the other hand, refer to those control forces resulting from normal or failure conditions that cannot readily be trimmed out or eliminated. The FAA is proposing to add these definitions of "transient" and "sustained" forces to AC 25–7.

In addition, the FAA proposes several minor editorial changes for §§ 25.143(c) through 25.143(e) to improve readability and correct grammatical errors. For example, the words "immediately preceding" are proposed to replace "next preceding" in § 25.143(d). These editorial changes are intended to clarify the existing interpretation of the affected sections.

Proposal 3

The FAA proposes to add the JAR 25.143(f) requirements regarding control force characteristics during maneuvering flight to part 25 as a new § 25.143(f). By adding these requirements, the FAA would ensure that the force to move the control column, or "stick," must not be so great as to make excessive demands on the pilot's strength when maneuvering the airplane, and must not be so low that the airplane can easily be overstressed inadvertently.

These harmonized requirements would apply up to the speed V_{FC}/M_{FC} (the maximum speed for stability characteristics) rather than the speed V_{MO}/M_{MO} (the maximum operating limit speed) specified by the current JAR 25.143(f). Requiring these maneuvering requirements to be met up to V_{FC}/M_{FC} is consistent with other part 25 stability requirements. Section 25.253, which defines V_{FC}/M_{FC}, would be revised to reference the use of this speed in the proposed § 25.143(f). An acceptable means of compliance with § 25.143(f), including detailed interpretations of the stick force characteristics that meet these requirements, would be added to AC 25–7.

Proposal 4

Section 25.149(f) requires that the minimum control speed be determined assuming the critical engine suddenly fails during (or just prior to) go-around from an all-engines-operating approach. For airplanes with three or more engines, § 25.149(g) requires the minimum control speed to be determined for a one-engine-inoperative landing approach in which a second critical engine suddenly fails. The FAA proposes to revise §§ 25.149(f) through 25.149(h) to clarify and revise the criteria for establishing these minimum control speeds, V_{MCL} and V_{MCL-2}, respectively, for use during approach and landing.

The FAA proposes to clarify that V_{MCL} and V_{MCL-2} apply not only to the airplane's approach configuration(s), as prescribed in the current standards, but also to the landing configuration(s). The FAA recognizes that configuration changes occur during approach and landing (e.g., flap setting and landing gear position) and considers that the minimum control speeds provided in the AFM should ensure airplane controllability, following a sudden engine failure, throughout the approach and landing.

Applicants would have the option of determining V_{MCL} and V_{MCL-2} either for the most critical of the approach and landing configurations (i.e., the configuration resulting in the highest minimum control speed), or for each configuration used for approach or for landing. By determining the minimum control speeds in the most critical configuration, applicants would not be required to conduct any additional testing to that already required by the current standards. Only if these resulting speeds proved too constraining for other configurations would the FAA expect applicants to exercise the option of testing multiple configurations.

The FAA also proposes to add provisions to state the position of the propeller, for propeller airplanes, when establishing these minimum control speeds. For the critical engine that is suddenly made inoperative, the propeller position must reflect the most critical mode of powerplant failure with respect to controllability, as required by § 25.149(a). Also, since credit cannot be given for pilot action to feather the propeller during this high flightcrew workload phase of flight, the FAA proposes that V_{MCL} and V_{MCL-2} be determined with the propeller position

of the most critical engine in the position it automatically achieves. For V_{MCL-2}, the engine that is already inoperative before beginning the approach may be feathered, since the pilot is expected to ensure the propeller is feathered before initiating the approach.

To assure that airplanes have adequate lateral control capability at V_{MCL} and V_{MCL-2}, the FAA proposes to require the airplane to be capable of rolling, from an initial condition of steady straight flight, through an angle of 20 degrees in not more than 5 seconds, in the direction necessary to start a turn away from the inoperative engine. This proposed addition to § 25.149 is contained in the current JAR 25.149.

The FAA is proposing guidance material for AC 25–7 to enable applicants to additionally determine the appropriate minimum control speeds for an approach and landing in which one engine, and, for airplanes with three or more engines, two engines, are already inoperative prior to beginning the approach. These speeds, $V_{MCL(1\ out)}$ and $V_{MCL-2(2\ out)}$, would be less restrictive than V_{MCL} and V_{MCL-2} because the pilot is assumed to have trimmed the airplane for the approach with an inoperative engine (for $V_{MCL(1\ out)}$) or two inoperative engines (for $V_{MCL-2(2\ out)}$). Also, the approach and landing procedures under these circumstances may use different approach and landing flaps than for the situations defining V_{MCL} or V_{MCL-2}. These additional speeds can be used as guidance in determining the recommended procedures and speeds for a one-engine-inoperative, or, in the case of an airplane with three or more engines, a two-engine-inoperative approach and landing.

The FAA proposes to revise § 25.125 to require the approach speed used for determining the landing distance to be equal to or greater than V_{MCL}, the minimum control speed for approach and landing with all-engines-operating. This provision would ensure that the speeds used for normal landing approaches with all-engines-operating would provide satisfactory controllability in the event of a sudden engine failure during, or just prior to, a go-around.

Proposal 5

The FAA proposes to revise the stall demonstration requirements of § 25.201 to clarify the airplane configurations and procedures used in flight tests to demonstrate stall speeds and stall handling characteristics. The list of acceptable flight characteristics used to define the occurrence of stall would also be revised. To be consistent with current practice, § 25.201(b)(1) would require that stall demonstrations also be conducted with deceleration devices (e.g., speed brakes) deployed. Additionally, the FAA proposes clarifying the intent of § 25.201(b) to cover normal, rather than failure, conditions by requiring that stalls need only be demonstrated for the approved configurations.

Section 25.201(c) would be revised to more accurately describe the procedures used for demonstrating stall handling characteristics. The cross-reference to § 25.103(b), currently contained in § 25.201(c)(1), would be moved to a new § 25.201(b)(4) for editorial clarity and harmony with the JAR–25 format. Reference to the pitch control reaching the aft stop, which would be interpreted as one of the indications that the airplane has stalled, would be moved from § 25.201(c)(1) to § 25.201(d)(3).

The list of acceptable flight characteristics that define the occurrence of a stall, used during the flight tests demonstrating compliance with the stall requirements, is provided in § 25.201(d). The FAA proposes to revise this list to conform with current practices. Section 25.201(d)(1)(ii) would be removed to clarify that a rolling motion, occurring by itself, is not considered an acceptable flight characteristic for defining the occurrence of a stall. The proposed § 25.201(d)(2) would replace the criteria of §§ 25.201(d)(1)(iii) and 25.201(d)(2) because only deterrent buffeting (i.e., a distinctive shaking of the airplane that is a strong and effective deterrent to further speed reduction) is considered to comply with those criteria. Finally, the proposed § 25.201(d)(3) would define as a stall a condition in which the airplane does not continue to pitch up after the pitch control has been pulled back as far as it will go and held there for a short period of time. Guidance material would be added to AC 25–7 to define the length of time that the control stick must be held in this full aft position when using § 25.201(d)(3) to define a stall.

Proposal 6

Section 25.201 currently requires stalls to be demonstrated at airspeed deceleration rates (i.e., entry rates) not exceeding one knot per second. JAR 25.201 currently requires, in addition, that turning flight stalls must also be demonstrated at accelerated rates of entry into the stall (i.e., dynamic stalls). According to the JAA, the intended procedure for demonstrating dynamic stalls begins with a 1 knot per second deceleration from the trim speed (similar to normal stalls). Then, approximately halfway between the trim speed and the stall warning speed, the flight test pilot applies the elevator control to achieve an increase in the rate of change of angle-of-attack. The final angle-of-attack rate and the control input to achieve it should be appropriate to the type of airplane and its particular control characteristics.

The AIA/AECMA petition detailed various difficulties with interpretation of the JAR–25 requirement, noted that the requirement is not contained in the FAR, and proposed that dynamic stalls be removed from JAR–25. Some of the concerns with the JAR–25 dynamic stall requirement include: (1) A significant number of flight test demonstrations for compliance used inappropriate piloting techniques considering the capabilities of transport category airplanes; (2) the stated test procedures depend, to a large extent, on pilot interpretation, resulting in test demonstrations that could vary significantly for different test pilots; (3) the safety objective of the requirement is not well understood within the aviation community; and (4) the flight test procedures that are provided are inconsistent with the flight characteristics being evaluated. As a result, applicants are unable to ensure that their designs will comply with the JAR–25 dynamic stall requirement prior to the certification flight test.

In practice, FAA certification testing has typically included stall demonstrations at entry rates higher than 1 knot per second. For airplanes with certain special features, such as systems designed to prevent a stall or that are needed to provide an acceptable stall indication, higher entry rates are demonstrated to show that the system will continue to safely perform its intended function under such conditions. These higher entry rate stalls are different, however, from the JAR–25 dynamic stalls.

Rather than simply deleting the dynamic stall requirement from JAR–25, or adding this requirement to part 25 of the FAR, the ARAC recommended harmonizing the two standards by requiring turning flight stalls be demonstrated at steady airspeed deceleration rates up to 3 knots per second. The FAA agrees with this recommendation and proposes to add the requirement for a higher entry rate stall demonstration to part 25 as § 25.201(c)(2). The current § 25.201(c)(2) would be redesignated § 25.201(c)(3). The JAA is proposing to replace the JAR–25 dynamic stall requirement with the ARAC recommendation.

The proposed higher entry rate stall demonstration is a controlled and repeatable maneuver that meets the objective of evaluating stall characteristics over a range of entry conditions that might reasonably be encountered by transport category airplanes in operational service. Some degradation in characteristics would be accepted at the higher entry rates, as long as it does not present a major threat to recovery from the point at which the pilot has recognized the stall. Guidance material is being proposed for AC 25–7 to point out that the specified deceleration rate, and associated rate of increase in angle of attack, should be established from the trim speed specified in § 25.103(b)(1) and maintained up to the point at which the airplane stalls.

The FAA proposes to revise § 25.203(c) to specify a bank angle that must not be exceeded during the recovery from the turning flight stall demonstrations. Currently, § 25.203(c) provides only a qualitative statement that a prompt recovery must be easily attainable using normal piloting skill. By specifying a maximum bank angle limit, the FAA proposes to augment this qualitative requirement with a quantitative one.

For deceleration rates up to 1 knot per second, the maximum bank angle would be approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction. These bank angle limits are currently contained in JAR–25 guidance material, and have been used informally during FAA certification programs as well. For deceleration rates higher than 1 knot per second, the FAA proposes to allow a greater maximum bank angle—approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction. These are the same acceptance criteria currently used by the JAA to evaluate dynamic stall demonstrations.

In addition to the amendments to part 25 proposed in this notice, revisions to AC 25–7 are being proposed to ensure that the harmonized standards would be interpreted and applied consistently. AC 25–7 provides guidelines that the FAA has found acceptable regarding flight testing transport category airplanes to demonstrate compliance with the applicable airworthiness requirements. Public comments concerning the proposed revisions to AC 25–7 are invited by separate notice published elsewhere in this issue of the Federal Register.

Regulatory Evaluation Summary

Preliminary Regulatory Evaluation, Initial Regulatory Flexibility Determination, and Trade Impact Assessment

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of the regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: (1) Would generate benefits that justify its costs and is not a "significant regulatory action" as defined in the Executive Order; (2) is not significant as defined in DOT's Policies and Procedures; (3) would not have a significant impact on a substantial number of small entities; and (4) would not constitute a barrier to international trade. These analyses, available in the docket, are summarized below.

Cost Benefit Analysis

Three of the proposed 48 revisions to the flight test airworthiness standards of part 25 would require additional flight testing and engineering analysis, resulting in compliance costs of $18,500 per type certification. When amortized over a representative production run of 500 airplanes, this total cost would result in a negligible incremental cost of $37 per airplane. The FAA solicits comments concerning the incremental flight test certification costs attributable to the proposed rule.

The primary benefits of the proposed rule would be harmonization of flight test airworthiness standards with the European Joint Aviation Requirements and clarification of existing standards. The resulting increased uniformity of flight test standards would simplify airworthiness approval for import and export purposes and would avoid some of the costs that can result when manufacturers seek type certification under both sets of standards. While not readily quantifiable, the potential cost avoidance would exceed the relatively minor incremental costs of the proposed rule.

The proposed rule would provide additional benefits by updating certain airworthiness standards. These updated standards would adopt terminology commonly used in airplane operations as well as better reflect current flight test practices.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Federal regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. Based on FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, the FAA has determined that the proposed amendments would not have a significant economic impact on a substantial number of small entities.

Trade Impact Assessment

The proposed rule would not constitute a barrier to international trade, including the export of American airplanes to foreign countries, and the import of foreign airplanes into the United States. Instead, the proposed flight testing standards have been harmonized with those of foreign aviation authorities, thereby lessening restraints on trade.

Federalism Implications

The amended regulations proposed in this rulemaking would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant preparing a Federalism Assessment.

Conclusion

Because the proposed changes to standardize specific flight requirements of part 25 of the FAR are not expected to result in substantial economic cost, the FAA has determined that this proposed regulation would not be significant under Executive Order 12866. Because this is an issue which has not prompted a great deal of public concern, the FAA has determined that this action is not significant under DOT Regulatory Policies and Procedures (44 FR 11034, February 25, 1979). In addition since there are no small entities affected by this proposed rulemaking, the FAA certifies, under the criteria of the Regulatory Flexibility Act, that this rule, if adopted, will not have a significant economic impact, positive

or negative, on a substantial number of small entities. An initial regulatory evaluation of the proposal, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under **FOR FURTHER INFORMATION CONTACT.**

List of Subjects

14 CFR Part 1

Air transportation.

14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Proposed Amendments

Accordingly, the Federal Aviation Administration (FAA) proposed to amend 14 CFR parts 1 and 25 of the Federal Aviation Regulations (FAR) as follows:

PART 1—DEFINITIONS AND ABBREVIATIONS

1. The authority citation for part 1 continues to read as follows:

Authority: 49 U.S.C. app. 1347, 1348, 1354(a), 1357(d)(2), 1372, 1421 through 1430, 1432, 1442, 1443, 1472, 1510, 1522, 1652(e), 1655(c), 1657(f), and 49 U.S.C. 106(g).

2. Section 1.1 is amended by adding a new definition to read as follows:

§ 1.1 General definitions.

* * * * *

"Go-around power or thrust setting" means the maximum allowable in-flight power or thrust setting identified in the performance data.

* * * * *

PART 25—AIRWORTHINESS STANDARDS—TRANSPORT CATEGORY AIRPLANES

3. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. app. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49 U.S.C. 106(g); and 49 CFR 1.47(a).

4. Section 25.119 is amended by revising paragraph (a) to read as follows:

§ 25.119 Landing climb: All-engines-operating.

* * * * *

(a) The engines at the power or thrust that is available eight seconds after initiation of movement of the power or thrust controls from minimum flight idle to the go-around power or thrust setting; and

* * * * *

5. Section 25.121 is amended by revising paragraph (d)(1) to read as follows:

§ 25.121 Climb: One-engine-inoperative.

* * * * *

(d) * * *

(1) The critical engine inoperative, the remaining engines at the go-around power or thrust setting;

* * * * *

6. Section 25.125 is amended by revising paragraph (a)(2) to read as follows:

§ 25.125 Landing.

* * * * *

(a) * * *

(2) A stabilized approach, with a calibrated airspeed of not less than 1.3 V_S or V_{MCL}, must be maintained down to the 50 foot height.

* * * * *

7. Section 25.143 is amended by revising paragraphs (c), (d), and (e) and adding a new paragraph (f) to read as follows:

§ 25.143 General.

* * * * *

(c) The following table prescribes, for conventional wheel type controls, the maximum control forces permitted during the testing required by paragraphs (a) and (b) of this section:

Force, in pounds, applied to the control wheel or rudder pedals	Pitch	Roll	Yaw
For transient application for pitch and roll control—two hands available for control ...	75	50	
For transient application for pitch and roll control—one hand available for control ...	50	25	
For transient application for yaw control	.....	.....	150
For sustained application	10	5	20

(d) Approved operating procedures or conventional operating practices must be followed when demonstrating compliance with the control force limitations for transient application that are prescribed in paragraph (c) of this section. The airplane must be in trim, or as near to being in trim as practical, in the immediately preceding steady flight condition. For the takeoff condition, the airplane must be trimmed according to the approved operating procedures.

(e) When demonstrating compliance with the control force limitations for sustained application that are prescribed in paragraph (c) of this section, the airplane must be in trim, or as near to being in trim as practical.

(f) When maneuvering at a constant airspeed or Mach number (up to V_{FC}/M_{FC}), the stick forces and the gradient of the stick force versus maneuvering load factor must lie within satisfactory limits. The stick forces must not be so great as to make excessive demands on the pilot's strength when maneuvering the airplane, and must not be so low that the airplane can easily be overstressed inadvertently. Changes of gradient that occur with changes of load factor must not cause undue difficulty in maintaining control of the airplane, and local gradients must not be so low as to result in a danger of overcontrolling.

8. Section 25.145 is amended by revising the introductory text of paragraph (b), and paragraphs (b)(3), (b)(4), and (c)(1) to read as follows:

§ 25.145 Longitudinal control.

* * * * *

(b) With the landing gear extended, no change in trim control, or exertion of more than 50 pounds control force (representative of the maximum transient force that can be applied readily by one hand) may be required for the following maneuvers:

* * * * *

(3) Repeat paragraph (b)(2) except at the go-around power or thrust setting.

(4) With power off, flaps retracted, and the airplane trimmed at 1.4 V_{S2}, rapidly set go-around power or thrust while maintaining the same airspeed.

* * * * *

(c) * * *

(1) Simultaneous movement of the power or thrust controls to the go-around power or thrust setting;

* * * * *

9. Section 25.149 is amended by revising paragraphs (f), (g) and (h) to read as follows:

§ 25.149 Minimum Control Speed.

* * * * *

(f) V_{MCL}, the minimum control speed during approach and landing with all engines operating, is the calibrated airspeed at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with that engine still inoperative, and maintain straight flight with an angle of bank of not more than 5 degrees. V_{MCL} must be established with—

(1) The airplane in the most critical configuration (or, at the option of the applicant, each configuration) for

approach and landing with all engines operating;

(2) The most unfavorable center of gravity;

(3) The airplane trimmed for approach with all engines operating;

(4) The most unfavorable weight, or, at the option of the applicant, as a function of weight;

(5) The propeller of the inoperative engine, if applicable, in the position it automatically achieves; and

(6) Go-around power or thrust setting on the operating engine(s).

(g) For airplanes with three or more engines, V_{MCL-2}, the minimum control speed during approach and landing with one critical engine inoperative, is the calibrated airspeed at which, when a second critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with both engines still inoperative, and maintain straight flight with an angle of bank of not more than 5 degrees. V_{MCL-2} must be established with—

(1) The airplane in the most critical configuration (or, at the option of the applicant, each configuration) for approach and landing with one critical engine inoperative;

(2) The most unfavorable center of gravity;

(3) The airplane trimmed for approach with one critical engine inoperative;

(4) The most unfavorable weight, or, at the option of the applicant, as a function of weight;

(5) If applicable, the propeller of the more critical engine in the position it automatically achieves and the propeller of the other inoperative engine feathered;

(6) The power or thrust on the operating engine(s) necessary to maintain an approach path angle of 3 degrees when one critical engine is inoperative; and

(7) The power or thrust on the operating engine(s) rapidly changed, immediately after the second critical engine is made inoperative, from the power or thrust prescribed in paragraph (g)(6) of this section to—

(i) Minimum power or thrust; and

(ii) Go-around power or thrust setting.

(h) In demonstrations of V_{MCL} and V_{MCL-2}—

(1) The rudder force may not exceed 150 pounds;

(2) The airplane may not exhibit hazardous flight characteristics or require exceptional piloting skill, alertness, or strength;

(3) Lateral control must be sufficient to roll the airplane, from an initial condition of steady straight flight, through an angle of 20 degrees in the direction necessary to initiate a turn away from the inoperative engine(s), in not more than 5 seconds; and

(4) For propeller airplanes, hazardous flight characteristics must not be exhibited due to any propeller position achieved when the engine fails or during any likely subsequent movements of the engine or propeller controls.

10. Section 25.201 is amended by revising paragraphs (b), (c), and (d) to read as follows:

§ 25.201 Stall demonstration.

* * * * *

(b) In each condition required by paragraph (a) of this section, it must be possible to meet the applicable requirements of § 25.203 with—

(1) Flaps, landing gear, and deceleration devices in any likely combination of positions approved for operation;

(2) Representative weights within the range for which certification is requested;

(3) The most adverse center of gravity for recovery; and

(4) The airplane trimmed for straight flight at the speed prescribed in § 25.103(b)(1).

(c) The following procedures must be used to show compliance with § 25.203:

(1) Starting at a speed sufficiently above the stalling speed to ensure that a steady rate of speed reduction can be established, apply the longitudinal control so that the speed reduction does not exceed one knot per second until the airplane is stalled.

(2) In addition, for turning flight stalls, apply the longitudinal control to achieve airspeed deceleration rates up to 3 knots per second.

(3) As soon as the airplane is stalled, recover by normal recovery techniques.

(d) The airplane is considered stalled when the behavior of the airplane gives the pilot a clear and distinctive indication of an acceptable nature that the airplane is stalled. Acceptable indications of a stall, occurring either individually or in combination, are—

(1) A nose-down pitch that cannot be readily arrested, which may be accompanied by a rolling motion that is not immediately controllable (provided that the rolling motion complies with § 25.203 (b) or (c) as appropriate);

(2) Buffeting, of a magnitude and severity that is a strong and effective deterrent to further speed reduction; or

(3) The pitch control reaches the aft stop and no further increase in pitch attitude occurs when the control is held full aft for a short time before recovery is initiated.

11. Section 25.203 is amended by revising paragraph (c) to read as follows:

§ 25.203 Stall characteristics.

* * * * *

(c) For turning flight stalls, the action of the airplane after the stall may not be so violent or extreme as to make it difficult, with normal piloting skill, to effect a prompt recovery and to regain control of the airplane. The maximum bank angle that occurs during the recovery may not exceed—

(1) Approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction, for deceleration rates up to 1 knot per second; and

(2) Approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction, for deceleration rates in excess of 1 knot per second.

12. Section 25.253 is amended by revising paragraph (b) to read as follows:

§ 25.253 High-speed characteristics.

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(b) *Maximum speed for stability characteristics,* V_{FC}/M_{FC}. V_{FC}/M_{FC} is the maximum speed at which the requirements of §§ 25.143(f), 25.147(e), 25.175(b)(1), 25.177, and 25.181 must be met with flaps and landing gear retracted. It may not be less than a speed midway between V_{MO}/M_{MO} and V_{DF}/M_{DF}, except that, for altitudes where Mach number is the limiting factor, M_{FC} need not exceed the Mach number at which effective speed warning occurs.

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